

BRIEF NOTE

Changes in Mixed Populations of *Orconectes (R.) sloanii* and *O. (P.) rusticus* (Crustacea: Decapoda: Cambaridae) in Southwestern Ohio¹

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ABSTRACT. Fifteen stream sites where *Orconectes (Rhoadesius) sloanii* (Bundy) and *O. (Procericambarus) rusticus* (Girard) were usually found together in 1975–1977 were revisited in 1989. In nine of the localities *O. sloanii* was absent and in three others the ratio of *O. sloanii* to *O. rusticus* had decreased. At the remaining three sites the ratio of *O. sloanii* to *O. rusticus* increased at one and *O. rusticus* was no longer found at the other two.

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INTRODUCTION

The success of *Orconectes rusticus* introductions in replacing a native species of crayfish has been debated in the literature. Berrill (1978), Capelli (1982), Jezerinac (1982), Butler (1983), and St. John (1988) have suggested that introduced *O. rusticus* individuals have been the cause of declining populations of native crayfish species. The data of Lodge et al. (1986) suggest that such introductions of *O. rusticus* do not necessarily result in the elimination of the native species.

Crayfish collections made in southwestern Ohio during 1975, 1976, and 1977 as part of other projects (St. John 1982, 1988) presented an opportunity to observe changes in the abundance of *O. sloanii* 12–14 years after the original collections were made.

MATERIALS AND METHODS

Fifteen localities (Fig. 1) in southwestern Ohio that were found in 1975–1977 to contain, with one exception, mixed populations of *O. sloanii* and *O. rusticus* were sampled again in May 1989. Specimens were collected by hand, with a metal strainer, or with a minnow seine (1.2 X 1.8 m; 0.64 cm mesh). The crayfish were fixed and preserved in the field in a mixture of ethyl alcohol (70%), glycerine (2%), and water (28%). The specimens are currently housed at The Ohio State University at Newark Crayfish Museum (OSUNCM), Newark, OH.

The identification of the crayfish species follows the nomenclature established by Fitzpatrick (1987) and Hobbs (1989).

RESULTS

Changes that have occurred during the 12–14 years between collecting at the 15 sites are shown (Fig. 1). At the site in Hamilton County both species were still present, but the ratio of *O. sloanii* to *O. rusticus* has increased since 1977. At two localities, both in Preble County, the *O. rusticus* population which was present in 1977 was not found, but the *O. sloanii* population remained. At three locations, one each in Butler, Montgomery, and Preble

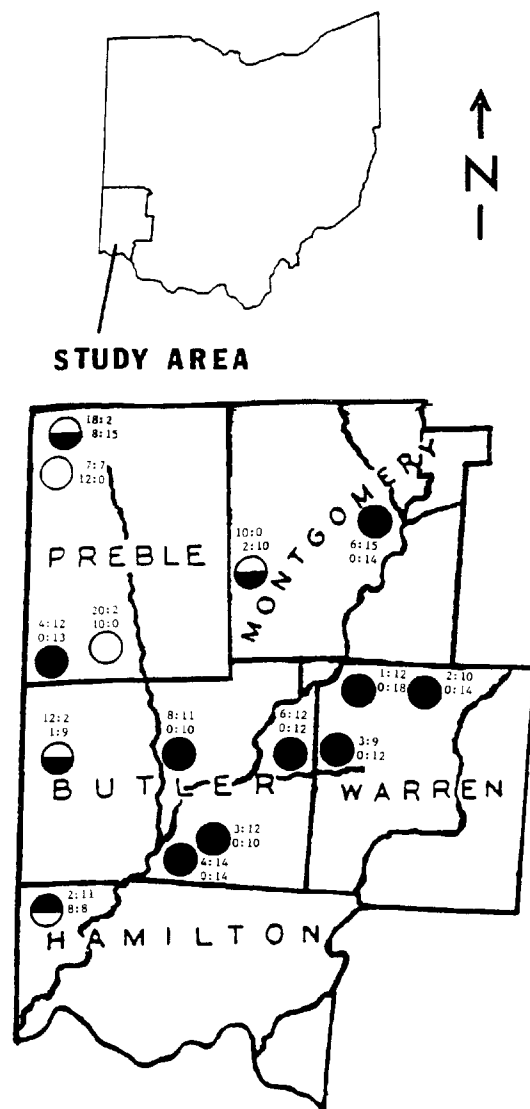


FIGURE 1. Changes in ratios of *O. sloanii* and *O. rusticus* between 1975–1977 and 1989. Circles represent collecting sites and indicate: open circle – *O. sloanii* present, *O. rusticus* not present; darkened upper half of circle – ratio of *O. sloanii* to *O. rusticus* increased; darkened lower half of circle – ratio of *O. sloanii* to *O. rusticus* decreased; and entire circle darkened – *O. rusticus* present, *O. sloanii* not present. Numbers with each circle are: upper line – ratio of *O. sloanii* to *O. rusticus* specimens in 1975–1977; lower line – ratio of *O. sloanii* to *O. rusticus* specimens in 1989.

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counties, the ratios of *O. sloanii* to *O. rusticus* have decreased since 1975–1977, however, both species were present. At the remaining nine sites where *O. sloanii* and *O. rusticus* were both present in 1975–1977, *O. rusticus* remains, now to the exclusion of *O. sloanii*.

DISCUSSION

The three localities in which the ratio of *O. sloanii* to *O. rusticus* has increased (in two with the elimination of *O. rusticus*) are in remote areas that have not yet been subjected to the effects of urbanization and/or industrialization. Both the sites in Preble County are in areas that have remained as farmland, and the one near Camden has, in fact, remained sufficiently remote that the ford across the creek has not yet been replaced with a bridge. The Hamilton County locality is at the edge of Miami Whitewater State Forest and is thus relatively protected. However, two localities in Montgomery County which had crayfish populations in 1975–1977 yielded no specimens in 1989, apparently because of habitat destruction. One was filled with trash and old tires, and the other had recently had the creek bed disturbed by the installation of a sewer system beneath it.

These data tentatively suggest that the success of *O. sloanii* in resisting the introduction and/or westward spread of *O. rusticus* is improved in an environment that is not stressed. In stressed environments *O. rusticus* introductions are more successful, often to the eventual

exclusion of the native *O. sloanii* populations. Data on changes in environmental factors that might induce stress are needed to test this hypothesis.

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